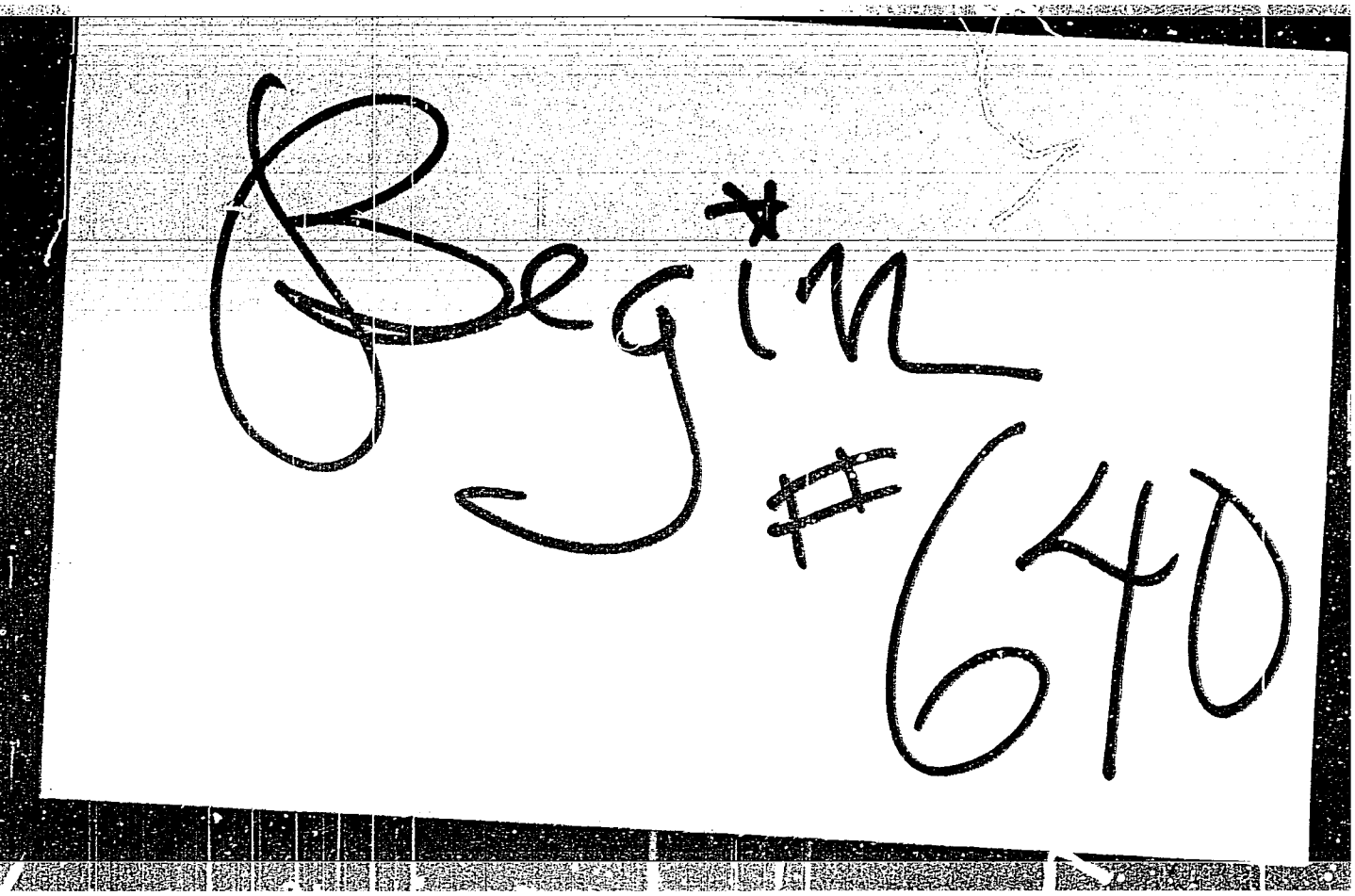


VANYUKOV, I.G.

[Keeping bees in two-story hives] Soderzhanie pchel v dvukhkorpusnykh ul'iakh. Moskva, Ministerstvo sel'skogo khoziaistva SSSR, 1956. (MLRA 10:5)
folder.

(Bees)

BEZBORODOVA, A.; DATSIV, V.; VANYUKOV, K.

Practices of apartment-house offices in taking care of children. Zhil.-kom. khoz. 8 no.12:20-21 '58. (MIRA 13:1)

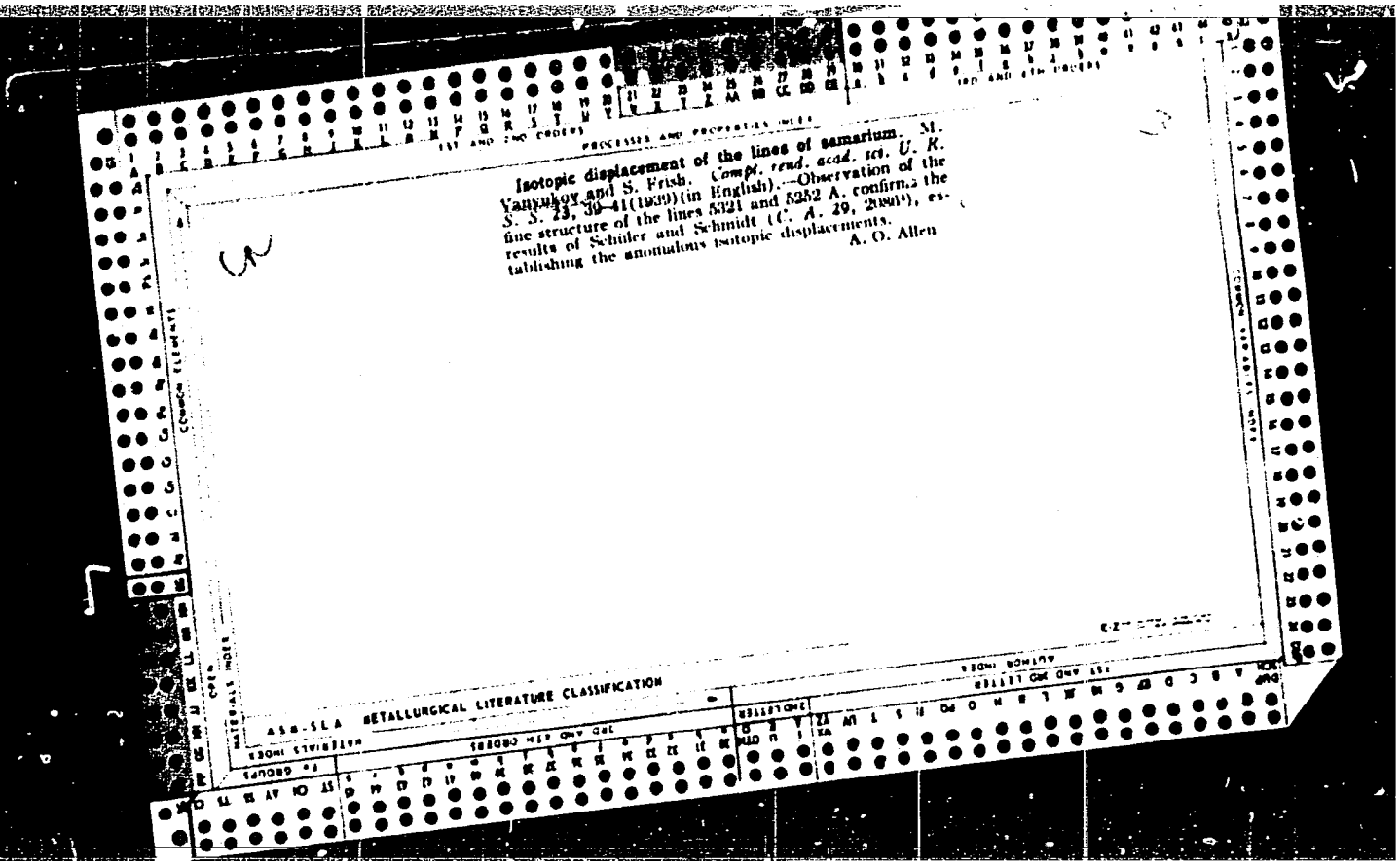
1.Sekretar' Chelyabinskogo gorkoma komsomola (for Bezborodova). 2.Sekretar' Ufimskogo gorkoma komsomola (for Datsiv). 3.Predsedatel' roditel'skogo komiteta pri zhilishchnoy kontore No.3 Petrogradskogo rayona Leningrada.

(Children--Management)

VANYUKOV, K.

Plenums of trade-union committees. Sov.profsoiuzy 4 no.12:64-66 D '56. (MLRA 10:1)

1. Instruktor TSentral'nogo komiteta profsoyuza rabochikh morskogo i rechnogo flota. (Trade unions)



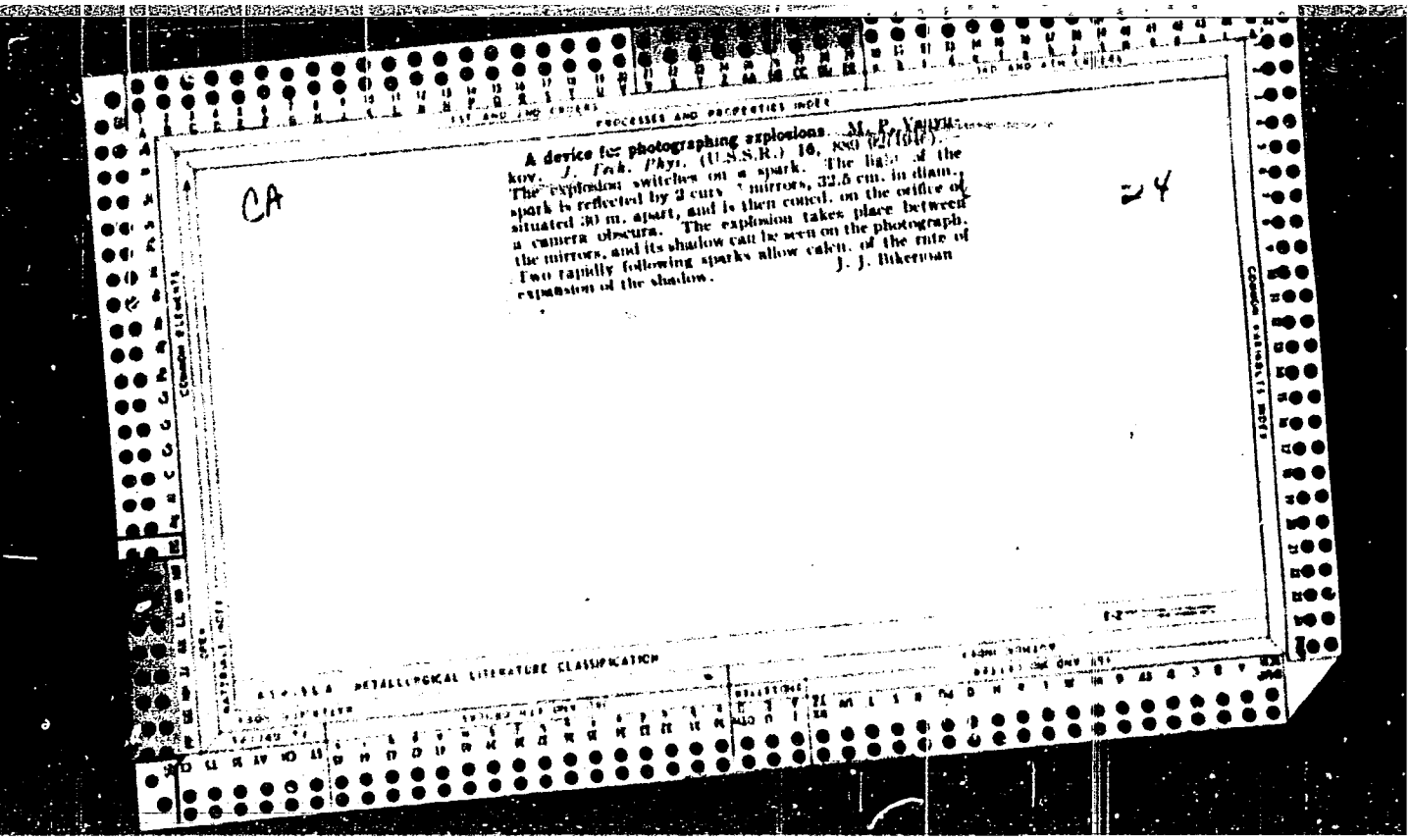
Isotopic displacement of the lines of samarium. M. Yanyukov and S. Frish. (*Compt. rend. acad. sci. U. R. S. S.* 23, 39–41(1939))(in English).—Observation of the fine structure of the lines 5321 and 5232 A. confirms the results of Schüler and Schmidt (*C. A.* 29, 2980[1]), establishing the anomalous isotopic displacements.
A. O. Allen

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

VAINYUKOV, M. P. and Aleksandrov, B.A.

"Optic Measurements of the Phenomenon of a Directed Blast," a report presented at one of the sessions of the General Assemblies of OFMI in 1944.

IAN-Ser Fiz, Vol 9, No 3, 1945



CA

24

A device for photographing explosions. M. P. Vuk-
kov. *J. Tech. Phys.* (U.S.S.R.) 10, 850 (1940).
The explosion switches on a spark. The light of the
spark is reflected by 2 curved mirrors, 32.5 cm. in diam.,
situated 30 m. apart, and is then concd. on the orifice of
a camera obscura. The explosion takes place between
the mirrors, and its shadow can be seen on the photograph.
Two rapidly following sparks allow calcn. of the rate of
expansion of the shadow. J. J. Bikerman

VANYUKOV, M. P.

USSR/Physics - Spectra, Flash 21 Sep 53

"Photoelectric Method of Recording Variation in Time of Spectra of Light Flashes," M.P. Vanyukov and L.D. Khazov

DAN SSSR, Vol 92, No 3, pp 523-524

Describes an improved apparatus for photoelectric recording of spectra which shows immediately curve of spectral distribution of emission at any specified moment. The resolution in time depends only on the rapidity of recording of phenomena on oscillograph, which for the time being is 10^{-8} sec.

268T92

Indebted to S.E. Frish, Corr Mem, Acad Sci USSR and to Acad A.A. Lebedev, who also presented article, 20 Jul 53.

268T92

VANYUKOV, M.P.

USSR/Physics - Electron-optic photography

FD-897

Card 1/1 Pub 153-6/26

Author : Vanyukov, M. P. and Nilov, Ye. V.

Title : Application of the electron-optic image-converter in photography of rapidly occurring processes

Periodical : Zhur. tekh. fiz. 24, 1209-1218, Jul 1954

Abstract : Possibility of employing electron-optic converters is studied with AEG-type electrostatic focusing as fast-acting shutters by switching them in by means of short voltage-pulses. At instantaneous illumination of the order of 10^6 lux at the photocathode, a redistribution of brightness and distortion of the image occur. These phenomena are due to space charge in the tube and the potential relief on the cathode. Various stages of the spark discharge in argon were photographed at exposures of 0.4 to 2 microseconds. Indebted to A. A. Lebedev. Eleven references including 5 foreign.

Institution : --

Submitted : March 9, 1954

FD-3203

USSR/Physics - Electricity, Discharge phenomena

Card 1/1 Pub 153-12/28

Author : Vanyukov, M. P., Isayenko V. I., and Khazov, L. D.

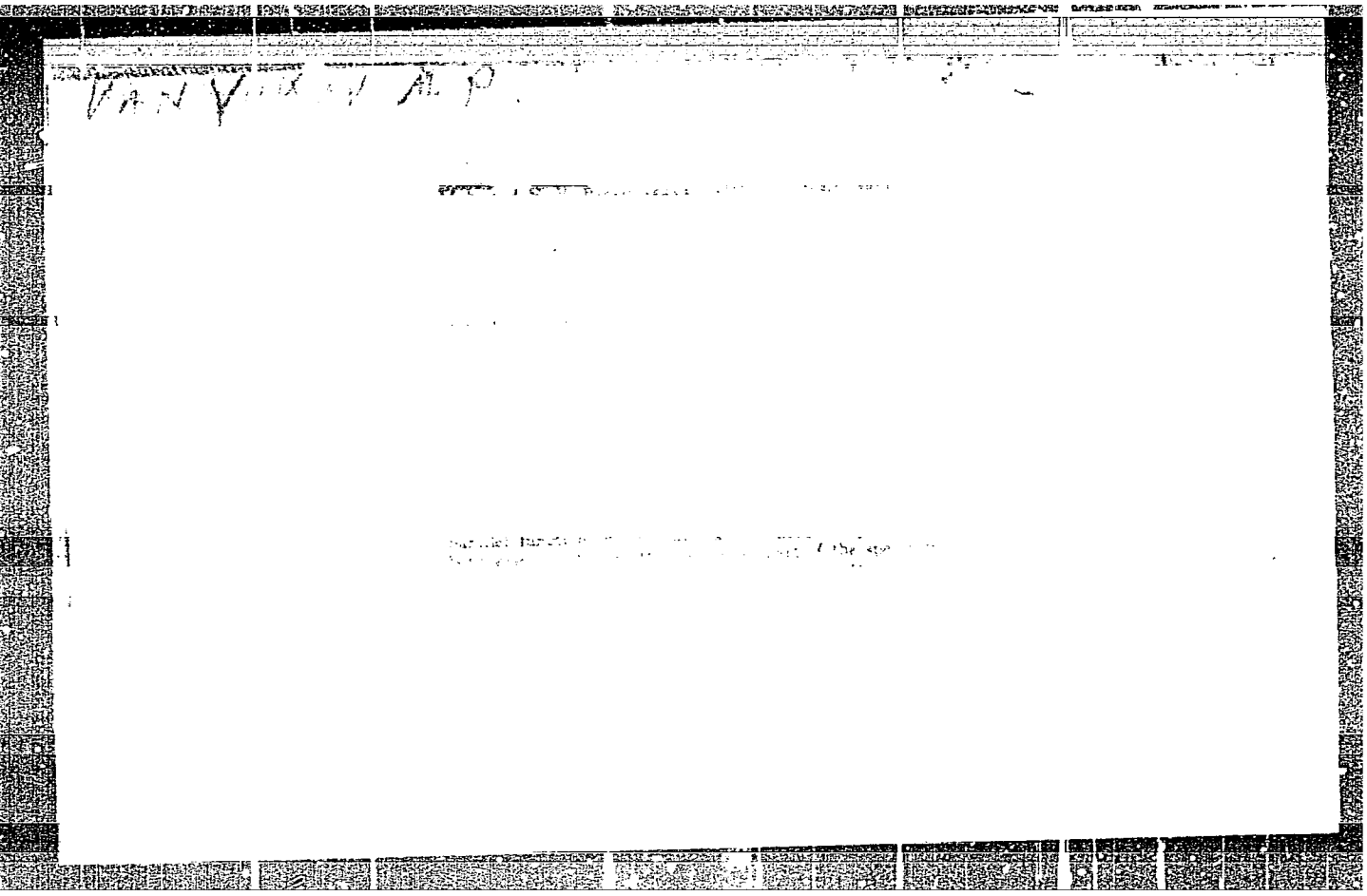
Title : Investigation of light phenomena associated with the growth of the channel of a spark discharge

Periodical : Zhur. Tekh. Fiz. 25, No 7, 1248-1256, 1955

Abstract : Experimental investigation using an electron-optical converter, of the space-time expansion of the visible and infrared luminescence of a spark discharge channel, and of the propagation of the shock wave generated by the discharge revealed: (a) the shock wave separated from the plasma of the discharge; (b) a layer of heated, non-ionized gas emitting infrared radiation in the form of arc lines was formed between the shock wave and the plasma; (c) the temperature of the discharge in inert gases increases with the atomic weight of the gas; (d) the average channel temperature was determined from measurements of the spectral density of energy brightness to be 57,000°K. Authors thanked Acad. A. A. Lebedev for assistance. Diagram, graphs, photos. Ten references: seven USSR.

Institution :

Submitted : November 24, 1954



VANYUKOV, M.P.

SUBJECT USSR / PHYSICS CARD 1 / 2 PA - 1700
AUTHOR VANJUKOV,M.P.
TITLE The Application of an Electron-Optic Transformer for the Study of Fast Effects.
PERIODICAL Usp.fis.nauk, 60, fasc.2, 295-326 (1956)
Issued: 12 / 1956

This is a survey of works published in the course of the last 5-6 years on the application of an electron-optic transformer as a rapidly working shutter as well as on the electron-optic development thereby obtained. By way of illustration, the results of investigations carried out by using these new and most effective methods of rapid photography are mentioned.
1. The electron-optic shutter and its application: At first the methods of producing such a shutter are discussed. The first attempts in this direction were made with a standard type electron-optic transformer with electrostatic focussing. In the Soviet Union such work was begun by dynamic operation in 1949 at the suggestion of the academician A.A.LEBEDEV, and already in 1950 the first positive results in form of three-electrode transformers with electrostatic focussing (type AEG) were obtained; in 1951 the impulse circuit of a standard type five-electrode transformer was constructed. Furthermore, a transformer with combined electrostatic and magnetic focussing is mentioned, and a transformer developed specially for short exposure photography is discussed on the basis of a simple drawing. Constructional elements and the circuit of this device are discussed. On the occasion of the investigation of easily repro-

ducible phenomena it is advisable to use the simple photographic method. By re-taking the photograph at different stages, it is possible to obtain a series of pictures by which the development in time of the phenomenon is shown with sufficient clearness. With the help of the electron-optic transformer it is possible to build a high frequency stroboscope by means of which it is possible to watch and to investigate periodically recurring phenomena with a much higher frequency than would be possible with an ordinary stroboscope. With the help of the impulse circuit of the electromagnetic transformer it is possible to construct a purely electromagnetic scheme for television in colors. The defects occurring in the pictures produced by means of this impulse circuit and a possibility for the increase of the resolving power of impulse-like connected electronic lenses is discussed. By the method described it is possible to obtain pictures of better quality than with the same optics but with parallel current feed.

2. The electron-optic development and its applications. The electron-optic transformer can be used also for the high-frequency development in space and time of light phenomena. The various methods to be employed are discussed.

INSTITUTION:

VANYUKOV, M.P

51-6-26/26

AUTHOR: None given.

TITLE: XI Lecture imeni Academician D.S. Rozhdestvenskiy. (Odinnadtsatyye chteniya imeni akademika D. S. Rozhdestvenskogo.)

PERIODICAL: Optika i Spektroskopiya, 1957, Vol.II, Nr.6, p. 828. (USSR)

ABSTRACT: Complete Translation.

The XI Rozhdestvenskiy Lecture, named after one of the founders of the State Optical Institute imeni S.I. Vavilov, took place at that Institute on 16th May 1957. Two papers were presented at this lecture.

In his paper "On Colour Vision", Prof. G.N. Rautian described the retina as a triple receiver of radiant energy which, as a first step, limits, orders and analyses the information received by the eye and then compresses this information for coded transmission to the brain.

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XI Lecture imeni Academician D.S. Rozhdestvenskiy.

The three-dimensional character of colour as a retinal stimulus forms the basis of measurement of colour and its representation in an affine vector space. Of great importance is the problem of the basic physiological system of colour determination since the coordinates of colour in that system characterise the spectral sensitivity of the three types of receivers on the retina.

Rautian discussed the method of finding directions of the physiologically important coordinate axes by tests using dichromats reported in the Yustova-Nyuberg work. He also discussed other methods used in USSR and based on dichromatism which is either temporal (N.T. and V.N. Fedorov) or spatial (M. Bongard and M. Smirnov).

Establishment of spectral sensitivity curves of the retinal receivers would lead to the most direct methods of study of colour vision. This was shown on the example of a new anomaloscope ГОИ and the results obtained with it which widen our knowledge of the

XI Lecture imeni Academician D.S. Rozhdestvenskiy.

multiplicity of forms of colour vision and permit us to construct a more elastic and precise classification of these forms. Another example quoted was the proposal for rationalisation of street traffic signals to make them correctly understood by all dichromats.

At the end of the paper the author discussed some new attempts at interpretation of the phenomena which form the basis of selective sensitivity of the retinal receivers.

Candidate of physico-mathematical sciences M.P. Vanyukov presented a paper on "Emission by a High-temperature Pulse Discharge".

This paper presented the results of the study of certain optical characteristics of spark discharges in heavy inert gases (argon, krypton and xenon) at pressures of 4-10 atm. Using a new photoelectric

XI Lecture imeni Academician D.S. Rozhdestvenskiy.

technique temporal variations of the discharge were recorded in the spectral region from 2500 to 10000 Å and dynamics of the variation of the form of arc lines in the process of discharge was determined with resolution in time of 10^{-7} sec and in wavelength of 1 Å. The brightness of the spark-discharge channel has a limiting value which in xenon at 5 atm is about 11 x 10^6 stilbs. In capillary-tube discharges brightness increased continuously with increase of the discharge energy and no saturation in brightness was observed. In the capillary discharges brightnesses up to 50 x 10^6 stilbs and temperatures up to 94000°K were obtained.

AVAILABLE: Library of Congress.

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SOV/120-58-6-17/32

AUTHORS: ~~Vanyukov, M. P.~~ and Isayenko, V. I.

TITLE: A Pulsing Tube Circuit for Obtaining a High Discharge Repetition Rate (Skhema vklyucheniya impul'snykh lamp s bol'shoy chastotoy povtoreniya vspyshek)

PERIODICAL: Pribory i tekhnika eksperimenta, 1958, Nr 6, pp 85-88 (USSR)

ABSTRACT: Stroboscopic tubes are normally connected in a circuit consisting of two inductances, two capacitors and an auxiliary inductance for triggering the tube; the circuit is shown in Fig.1. One of the difficulties in employing the circuit is that comparatively low repetition frequencies are possible. A more elaborate circuit, based on the same principle, was therefore developed. This consists of a supply unit (see Fig.2) and a triggering unit (see Fig.). The circuit is suitable for operating a stroboscopic triode (marked S in Fig.2). The storage capacitors C_1 and C_2 in the circuit are charged from a constant voltage source through a choke L, by means of two groups of high-voltage diodes, B_1 and B_2. The triggering unit consists of a frequency generator (a multivibrator) and a delay circuit;

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A Pulsing Tube Circuit for Obtaining a High Discharge Repetition Rate

by means of two blocking oscillators it produces two pulses of 3 μs duration, which are spaced at 15 μs apart. The first pulse of the triggering unit is employed to close the oscillatory circuit consisting of C_1 and L_0 in the supply unit, while the second pulse triggers a thyratron which supplies a pulse to the triggering electrode of the stroboscopic tube. The diodes B_3 and B_4 in the supply circuit of Fig.2 provide clamps for the storage capacitors, so that these cannot be charged negatively. By employing the circuit it is possible to drive the tube at repetition rates up to 4000 pps, but the discharge energy is reduced with increasing repetition rates. Thus, for example, at 500 pps the energy per discharge is 3.5 joules while at 4000 pps it is only 0.23 joules. The paper contains 3 figures, 1 table and 12 references, of which 4 are English, 5 are German and 3 are Soviet.

ASSOCIATION: Gosudarstvennyy opticheskiy institut(State Optics Institute)

SUBMITTED: December 9, 1957.

VANYUKOV, M.P.

51-4 -1-13/26

AUTHORS: Vanyukov, M. P., Mak, A. A. and Ures, M. Ya.

TITLE: Instantaneous Brightness of a Spark-Discharge Channel in a Capillary. (Mgnovennaya yarkost' kanala iskrovogo razryada v kapillyare.)

PERIODICAL: Optika i Spektroskopiya, 1958, Vol.IV, Nr.1, pp. 90-92. (USSR)

ABSTRACT: The paper reports results of measurements of the spectral density of brightness of a spark discharge channel in capillaries filled with air at atmospheric pressure, or with xenon at 4 atm. The technique of measurement and apparatus are described in Ref.2. Capillaries filled with air were glass tubes with internal diameter of 0.25, 0.4 and 1.35 mm and an inter-electrode distance of 10 mm. Capillaries filled with xenon were quartz tubes with an internal diameter of 2.5 mm. Brightness

Card 1/4 was measured in the direction at right-angles to the

Instantaneous Brightness of a Spark-Discharge Channel in a Capillary.

capillary. For the sake of comparison, measurements of brightness of the spark discharge were made also in an unbounded air gap. Fig.1 shows curves, for air, of the spectral density of brightness as function of the wavelength under various discharge conditions at the moment when the spectral density of brightness at 4494 Å reaches its maximum. At constant discharge energy narrowing of the discharge channel by the capillary produces an increase of the channel brightness, particularly in the short-wavelength part of the spectrum. Decrease of the capillary diameter cannot be carried on indefinitely since in very narrow capillaries brightness decreases (e.g. in 0.25 mm capillary brightness is

 less than in the 0.4 mm capillary). Increase of the

Instantaneous Brightness of a Spark-Discharge Channel in a Capillary.

energy of discharge through a capillary increases brightness. The highest brightness of 50×10^6 stilbs was obtained in a channel 0.4 mm wide, filled with air at atmospheric pressure, on discharging a 0.011 μF condenser charged to 29 kV. The brightness temperature for this case was 94 000°K. Increase of the inter-electrode distance from 10 to 20 mm does not appreciably change the spectral density of brightness. Fig.2 shows the results for xenon in a 2.5 mm capillary filled with xenon at 4 atm (curve 1) and for a spherical pulse-discharge lamp also filled with xenon (curve 2). The results of Fig.2 show that brightness

 in a capillary filled with xenon (7×10^6 stilbs) is

Instantaneous Brightness of a Spark-Discharge Channel in a Capillary.

less than the corresponding brightness in the spherical lamp (11×10^6 stilbs). This is due to the fact that the discharge-channel width in a 2.5 mm capillary is limited by that capillary at a comparatively late stage of the discharge. Figs.1 and 2 show that radiation from a capillary discharge differs considerably from black-body radiation (dashed curves), except at high energy densities in the discharge channel (Fig.1, curves 1 and 3). The results obtained are summarized in a table on p.92. There are 2 figures, 1 table and 5 references, of which 4 are Russian and 1 American.

Card 4/4

ASSOCIATION: State Institute of Optics imeni S. I. Vavilov. (Gos. opticheskiy institut im. S. I. Vavilova.)

SUBMITTED: March 18, 1957.

AVAILABLE: Library of Congress.

1. Capillaries-Spark discharge-Brightness
2. Capillaries-Spectral density

Vanyukov

VANYUKOV, M.P., kand.fiz.-mat.nauk; DOBRETSOV, A.F., inzh.; ISAYENKO, V.I., inzh.; MAK, A.A., inzh.

Sectional high-ressaure spark discharge lamp. Svetotekhnika 4 no.4:9-11 Ap '58. (MIRA 11:4)

1.Gosudarstvennyy opticheskiy institut.
(Electric lamps)

VANYUKOV, M.P.; GOROKHOVSKIY, Yu.N.

Conference on high-speed photography and cinematography.
Usp. fiz. nauk 64 no.4:790-795 Ap '58. (MIRA 11:7)
(Photography, High-speed) (Cinematography--Scientific applications)

AUTHORS: Vanyukov, M. P., Mak, A. A. SOV/53-66-2-6/9

TITLE: Pulsed Light Sources of Great Brightness (Impul'snyye istochniki sveta vysokoy yarkosti)

PERIODICAL: Uspekhi fizicheskikh nauk, 1958, Vol 66, Nr 2, pp 301-329 (USSR)

ABSTRACT: The present paper is an abstract compiled from 100 Soviet and non-Soviet publications. It gives a concentrated survey of the present stage of spark-discharge devices, their characteristics, and their theories. Chapter I.: Spark discharges in gases. Emission of radiation caused by the slowing-down of electrons in the field of positive ions (free-free transition), by the recombination of electrons and ions (transition from a free to a bound state), and by transitions from bound to bound states - emission of considerably broadened lines.

I. 1) Methods of producing spark discharges of high intensity: Connection between U_0, C, L, ωt, molecular weight of the gas, pressure; discussion of a pulse tube with condenser according to Früngel (Fryungel') (Ref 11, Fig 1), scheme of discharge circuit with condensers connected in parallel

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(Fig 2, Ref 12); pulse tube with ceramic condensers (Fig 3) as constructed by Vanyukov, Dobretsov, Isayenko, Mak - 28 kV, 0,022 μF, 0,06 μH, to 4 kW; coaxial condenser according to Fisher (Ref 15), high-voltage toroid condenser (Ref 16); discharge circuit for large pulses and small L - investigated by Komel'kov and Aretov (Ref 20), construction of 48 different condensers ~134 μF, operating voltage 50 kV and L = 0,025 μH; maximum current in the circuit $2.1.10^6$ A.

I.2) Methods of measuring brightness and temperatures (Refs 15, 22 - 27). Measurement of temperature in spark discharges (Refs 25, 28); photographic method (Refs 24, 27); photoelectric method (Refs 4, 11, 15, 22, 23, 26, 29, 30-32); photochronograph (Fig 6); photoelectric device for the measurement of brightness developed by Vanyukov, Mak, Parazinskaya, (Ref 22, Fig 7). Furthermore, a number of theoretical investigations was discussed as e.g. the investigation of the distribution of atoms and ionization in the channel of a spark discharge (Refs 22, 23, 29, 31, 32); investigation of the spectral distribution of radiation (according to Planck's law); Komel'kov and Parfenov (Ref 44) calculated the plasma temperature in spark discharges according to the theory of the pinch effect (Ref 45): $2NkT = I^2$, where I denotes the discharge current

and N - the number of particles per cm of the length of the discharge channel.

I. 3) The maximum degree of brightness attainable by means of spark discharges in gases. Systematic investigations carried out by Vul'fson, Libin, Charnaya (Ref 46), investigations of the saturation effect (Refs 22, 23); photoelectric methods; investigation of the spectral intensity dependence on time in the individual parts of the discharge channel (Figs 8, 9), in dependence on L (Fig 10) (Refs 22, 47); investigation of the intensity of spark discharges in air (Ref 46), in noble gases, nitrogen, oxygen, and helium (Ref 26), etc. Table 1 shows a collection of valuesfor the temperature and brightness of various gases arranged according to authors and references.

I. 4) Physical processes limiting the brightness of spark discharges (Refs 4, 15, 22, 25, 26), Zel'dovich (Refs 51, 53), Rayzer (Ref 52); dependence of the absorption coefficient of radiation on T, formula by Kramers;(Refs 23, 26; Fig 14): dependence of the spectral density of brightness on λ. Dolgov, Mandel'shtam (Ref 55) investigated the density distribution in gas in a spark discharge.

II. Spark discharges in capillaries (Refs 13, 19, 25, 59 etc.). Wiring scheme for parallel condensers, C_i = 100 uF, L_i = 1,5 μH. Investigation of the optical properties of the plasma in spark discharges (Refs 25, 29, 31, 32, 40, 50, 60, 61). Parameters are shown in table 2. Investigation of the connection between temperature and voltage (Fig 17, Ref 32); the influence exercised by the material of tube walls (Refs 52, 60, 62-64).
III. Sliding spark discharges (discharges between electrodes located on the surface of dielectrics). Duration of flashes: 10^{-6} - 10^{-7} sec (Refs 65-74, 13) "Defatron" (10^{-6} sec, 200 J, 22 kV) wiring scheme for defatron spark discharge (Fig 18).
IV. Electric wire explosions (the wire material goes over into metal vapor in the manner of an explosion, high temperature plasma, 10^{-6} - 10^{-7} sec) (Refs 76, 77-87), determination of temperatures: references 28, 29 (20 000 - 30 000°K); photometrical investigations (Ref 91); reference 91: T = 150,000°K.
V. Shock waves, Propagation of shock waves: Zel'dovich, Rayzer (Ref 53), further, references 92 - 97, determination of the temperature of a wave front in inert gases etc.
VI. Possibilities of further increase of temperatures. Short survey. Theoretically, it could be possible to attain temperatures of the order of 10^{9}°K (Ref 100). There are 20 figures.

24(3)
AUTHORS: Vanyukov, M. P., Mak, A. A. SOV/20-123-6-18/50

TITLE: On the Temperature of the Channel of a Spark Discharge (O temperature kanala iskrovogo razryada)

PERIODICAL: Doklady Akademii nauk SSSR, 1958, Vol 123, Nr 6, pp 1022-1024 (USSR)

ABSTRACT: This paper discusses the results obtained by measuring the temperature of the channel of spark discharges in argon, xenon and hydrogen by determining the spectral density of channel brightness for wave lengths which correspond to the center of gravity of the lines. These measurements are carried out for various rates of entering of the energy into the discharge-channel. Measuring methods were discussed in a previous paper. The measuring apparatus is discussed in short. The radiation was investigated in argon for the lines 4806; 4348, and 3588 Å, in xenon for 2900 and 2600 Å. The results of the measurements are shown by 2 figures. In the investigated interval of variation of contour inductivity, the discrete radiation (lines) of argon and xenon reached practically the extreme value. Continuous radiation, however, at < 4000 Å by far does not reach

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saturation value. The continuous and the discrete radiation of the discharge in nitrogen (p = 2 atm) was investigated in the spectral region 4000-6000 Å. Under these conditions, brightness was saturated at wave lengths above 5500 Å for continuous irradiation and also for all the investigated lines (λ 4097; 5001; and 5045 Å). According to Planck (Plank)'s formula for the irradiation of an absolutely black body, the authors calculated the temperatures which correspond to the spectral densities of the brightness for those wave lines of the discrete and of the continuous spectra for which a saturation of the brightness was observed. The straggling of the temperature values for various wave lengths is very small, especially for xenon and nitrogen. According to these results, the temperature of the channel of the spark discharge only to a small extent depends on the rate of entering of the energy into this channel. The distribution of the temperature over the cross section of the channel appears to be uniform. The authors thank V. R. Muratov who assisted in carrying out some of the measurements. There are 4 figures and 9 references, 8 of which are Soviet.

PRESENTED: July 7, 1958, by A. A. Lebedev, Academician

SUBMITTED: June 27, 1957

21(7) SOV/54-59-3-5/21

AUTHORS: Yanyukov, M. P., Yermakov, B. A., Mak, A. A., Muratov, V. R.

TITLE: Recording of the Variation With Time of the Contours of Spectral Lines in the Radiation of a Spark Discharge

PERIODICAL: Vestnik Leningradskogo universiteta. Seriya fiziki i khimii, 1959, Nr 3, pp 25-32 (USSR)

ABSTRACT: In the present paper a three-channel photoelectric apparatus for the recording of the variations with time pulses of the discharge spectra is developed for a wide intensity interval. The scheme of the apparatus is represented in figure 1. The spectral decomposition of the periodic discharges was made by means of a monochromator according to Eberth and Fast with a plane diffraction grating for interferences of first order. The grating was constructed by F. M. Gerasimov in the GOI Laboratory. During the recording the grating slowly rotated. It was connected with an electron selfrecording potentiometer of the type EPP-0.9 over a synchronous transmitter. The angular velocity of the grating could be adjusted gradually from 60 to 12, 2.5, 0.5, and 0.1 Å/min. The radio apparatus consisted of three uniform channels permitting a simultaneous recording of the spectrum at three different instants, i.e. the amplitude of

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the pulse obtained at the outlet of the electron trigger is proportional to the value average with respect to time Δt of the signal to be investigated for a given period of delay t_3. The pulses obtained are thus modulated according to the spectral radiation distribution of the pulse source for time t_3. These pulses arrive at a collecting scheme, subsequently at a direct-current amplifier, and finally at the selfrecording potentiometer. The three channels record in the time intervals 0.05 - 0.45 μsec, 0.4 - 20 μsec, and 0.5 - 50 μsec. For the determination of the best working conditions the time of adjustment of the collecting element was varied. By means of this device line contours and also the shift of the maxima toward 0.1 Å may be observed. The limit of the time resolving power with time is 5.10^{-8} sec. In the figures 2-7 the contours of the spectral lines of nitrogen and helium in spark discharge tubes are represented. Herefrom it may be seen that the lines widen mainly in the first stage of discharge (Fig 7) which indicates a Stark line widening. The maximum concentration of the charged particles is observed at the beginning of discharge.

Recording of the Variation With Time of the Contours of Spectral Lines in the Radiation of a Spark Discharge

SOV/54-59-3-5/21

It was found from the helium line II 4686 Å that it is $\sim 10^{18}$ cm^{3}. Also the arc discharge spectra of helium could be recorded. The observed asymmetry of the lines could be explained by the direction of the line shift. There are 7 figures and 7 references, 3 of which are Soviet.

SUBMITTED: April 14, 1959

Card 3/3

VANYUKOV, M.P.; MAK, A.A.

Brightness of some pulse light sources. Usp.nauch.fot. 6:31-34 '59.
(MIRA 13:6)
(Electric discharge lighting)

VANYUKOV, M.P.; DOBRETSOV, A.F.; ISAYENKO, V.I.; MAK, A.A.

Powerful pulse light source. Usp.nauch.fot. 6:53-57 '59.
(MIRA 13:6)

(Electric discharge lighting)
(Photography, Flashlight)

SOV/109-4-8-10/35

AUTHORS: Vanyukov, M.P., Mak, A.A. and Muratov, V.R.

TITLE: Time Spectra of the Radiation of Spark Discharges in Inert Gases

PERIODICAL: Radiotekhnika i elektronika, 1959, Vol 4, Nr 8, pp 1284 - 1285 (USSR)

ABSTRACT: Some data relating to the time spectra of the light pulses in the spectrum bandwidth, ranging from 2 500 - 12 000 Å, were recorded by means of the equipment devised by the authors (Ref 1). A detailed description of the equipment was given in Ref 2. The time resolution of the device was 5×10^{-8} sec. The spark discharges investigated were produced between spherical electrodes in tubes filled with argon, krypton or xenon; the pressure of the gas was 3.5 atm. and the inter-electrode distance was 10 mm. The voltages applied to the tube were from 5 - 12 kV, the storage capacitance was 0.01 to 0.05 μF and the circuit inductance was 0.1 to 12 μH. It was found that the radiation of the discharge consists of a continuous background and a number of broadened lines, many of which can be identified with the lines of single- and

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Time Spectra of the Radiation of Spark Discharges in Inert Gases

double-ionised gas atoms. If the storage condenser is decreased, the line in the vicinity of $\lambda = 3\,000$ Å is intensified. The lines of the double-ionised atoms appear during the initial stage of the discharge and are rapidly attenuated with time; the single-ionised atoms appear somewhat later and their attenuation is slower. There are 3 Soviet references.

SUBMITTED: March 5, 1959

Card 2/2

VANYUKOV, M. P.

24(2)20 66702

SOV/109-4-8-22/35

AUTHORS: Granovskiy, V.L., Luk'yanov, S.Yu., Spivak, G.V. and Sirotenko, I.G.

TITLE: Report on the Second All-Union Conference on Gas Electronics

PERIODICAL: Radiotekhnika i elektronika, 1959, Vol 4, Nr 8, pp 1339 - 1358 (USSR)

ABSTRACT: The conference was organised by the Ac.Sc.USSR, the Ministry of Higher Education and Moscow State University.

T.B. Fogel'son - "Methods of Reducing the Energy Lost in the Formation of a Breakdown".

L.I. Pivovar and V.I. Gordiyenko - "Microdischarges and pre-breakdown Currents Between Metal Electrodes in High Vacuum".

V.A. Simonov and G.P. Katukov - "Investigation of the Processes of Initiation and Development of a High-voltage Discharge in Vacuum".

S.M. Reykhrudel and G.V. Smirnitskaya - "The Characteristics of Ignition in High-vacuum in Magnetic Fields".

L.V. Tarasova et al. dealt with the transfer of the electrode material during the pre-breakdown stage in vacuum.

N.B. Rozanov et al. - "The Motion of Micro-particles of Substances During Electric Breakdown in Vacuum".

The third section dealt with the problems of electric sparks, corona and their practical applications. It was presided over by I.S. Stekol'nikov. The following papers were read:

V.I. Levitov et al. - "Probe Investigation of the a.c. Corona Fields".

G.N. Aleksandrov - "Elementary Processes in the Ionisation Zone of Corona-type Conductors at Atmospheric Pressures".

V.A. Burmakin - "Appearance of a Corona Discharge in Hydrogen and Nitrogen"

P.N. Chistyakov et al. - "Some Properties of the Corona Discharge in Hydrogen in Coaxial, Cylindrical System".

A.S. Sobolева and B.N. Klyarfel'd - "Appearance of Discharge Phenomena Between a Point and a Plane at Gas Pressures of 10^{-3} - 1.0 mm Hg".

Ya.Yu. Raynet et al. - "Methods of Unipolar Ionisation of Air By Means of Aero-ionisers (see p 1335 of the journal).

M.P. Vanyukov et al. - "Time Spectra of the Radiation of a Spark Discharge in Inert Gases" (see p 1284 of the journal).

M.P. Vanyukov and A.A. Mak - "Production of High Temperatures by Means of Spark Discharges".

V.A. Perstyagin - "Influence of the Magnetic Field of the Electric Discharge on the Dividing Surface of Two Media".

I.S. Stekol'nikov - "New Data From the Study of Long Sparks".

M.I. Synoyev - "Properties of the Breakdown of Compressed Air in a Comparatively Uniform Field in the Presence of Localised Non-uniformities".

A.A. Vorob'yev et al. - "Pulse and Oscillographic Techniques for the Measurement of the Discharge Lags in Dielectrics" (see p 1357 of the journal).

A paper by B.N. Zolotykh dealt with the problem of the basic theory of the electric erosion (see p 1330 of the journal).

The fourth section was presided over by S.Yu. Luk'yanov and was concerned with the non-stationary and low-frequency discharges. The following papers were read:

I.G. Nekrashevich and A.A. Labud - "The Nature of the Current Interruption During the Electric Explosion of a Metal Wire".

V.A. Simonov - "Propagation of Plasma From Local Pulse Sources".

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G.G. Timofeyev et al. - "Observation of an Electro-dynamically Compressed Arc By Means of an Electron-optical Converter".

M.S. Ioffe and Ye.Ye. Yushmanov - "Investigation of the Radial Electric Field in an Ion Magnetron".

V.A. Belyayev and M.K. Romanovskiy - "Experiments with an Electron Model of a System with Magnetic Samples".

A.M. Andrianov et al. "Distribution of Magnetic and Electric Fields In Powerful Pulse Discharges".

G.N. Harding (England) - "Spectroscopic Determination of the Plasma Temperature in the "Zeta" Equipment" (see p 1326 of the journal).

The paper by Harding aroused a lot of interest and Academician L.A. Artsimovich expressed the opinion that the electrons and ion temperatures in the "Zeta" should be of the same order. Instead, according to Harding, the electron temperature [illegible] order than that of the ions

SOV/51-6-1-3/30

AUTHORS: Vanyukov, M.P., Mak, A.A., and Muratov, V.K.

TITLE: Time Spectra of Emission by Spark Discharges in Inert Gases (Vremennyye spektry izlucheniya iskrovogo razryada v inertnykh gazakh)

PERIODICAL: Optika i Spektroskopiya, 1959, Vol 6, Nr 1, pp 17-23 (USSR)

ABSTRACT: The present paper describes time spectra of the intensity of emission by spherical pulse-discharge lamps filled with argon, xenon and krypton at 3.5 atm. The author studied the emission in the 2500-5500 Å region obtainable using various combinations of capacitance and inductance in the discharging circuit. The time spectra were obtained with photoelectric apparatus, whose resolving power was about 5×10^{-8} sec, developed earlier and described in Ref 2. An Ebert--Fasti monochromator, with a mirror objective of 320 mm diameter and a diffraction grating with 600 lines/mm, was used. The relative spectral sensitivity of the apparatus was measured using a standard incandescent lamp (Ref 3). The absolute (energy) scale for the intensity of emission was obtained at 4140 Å by using an incandescent lamp whose spectral energy density was known for that wavelength. The spectral slit-widths used were from 2 to 20 Å. The instantaneous values of the emission intensity of pulse-discharge lamps were measured

Time Spectra of Emission by Spark Discharges in Inert Gases

at various times t, counted from the beginning of the discharge. The first record was always obtained (with the exception of curve 1 in Fig 5) at the moment of the maximum intensity of emission. The results of measurements are given in Figs 1-9 in the form of two or three energy spectra obtained at various times. The results for argon are given in Figs 1 and 2, for krypton - in Figs 3-5, and for xenon - in Figs 6-9. The results of these figures show that increase of inductance in the discharge circuit reduces the intensity of continuous radiation and consequently the line emission becomes clearer. It was found that in the process of a spark discharge a continuous spectrum and lines of doubly ionized atoms appear first. Later the intensity of the doubly ionized lines decreases and instead the lines due to singly ionized atoms appear in the spectrum. The latter lines decay more slowly than the continuous background. The spectral distribution

Time Spectra of Emission by Spark Discharges in Inert Gases

of the continuous background differs greatly from that expected of a black body and was found to be only slightly dependent on the wavelength. This effect may be due to non-uniformity of the temperature distribution in various parts of the discharge channel and possibly also due to differences in the absorption coefficient of the discharge plasma in various spectral regions. There are 9 figures and 9 Soviet references.

SUBMITTED: March 4, 1958

Card 3/3

VANYUKOV, M.P.; YERMAKOV, B.A.; MAK, A.A.; MURATOV, V.R.

Record of the time variations of spectral line contours in the emission from a spark discharge. Vest.LGU 14 no.16:25-32 '59. (MIRA 12:10)

(Spectrum analysis)

24 (3), 24 (8)
AUTHORS: Vanyukov, M. P., Mak, A. A. SOV/48-23-8-6/25

TITLE: Maintenance of High Temperatures by Means of a Spark Discharge

PERIODICAL: Izvestiya Akademii nauk SSSR. Seriya fizicheskaya, 1959, Vol 23, Nr 8, pp 962 - 964 (USSR)

ABSTRACT: In connection with the development of light sources of high brightness, it is of great interest to find out how a maximum temperature within the spark channel may be maintained, and to obtain a picture of the temperature distribution in the mentioned channel. In the present paper the results of an investigation of the temperature within the spark channel, obtained by measuring the spectral intensity of the brightness, are described. The methods of measurements were previously described in another paper by the authors (Ref 1). The investigated lines of argon, xenon, and nitrogen are given. The dependence of the maximum spectral intensity of argon on the inductivity of the discharge circuit for 8 different wave lengths is given in the diagram of figure 1 and similar diagrams for the other gases investigated were elaborated (Ref 2). From these data the temperature was computed by means of Planck's formula and the results are summarized in the diagram of

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figure 2. It may be seen from the results that the temperature within the channel is constant in a considerable wide range of energy source and that the limits of this method of work may be determined. The absence of a temperature gradient within the spark channel, previously detected by P. G. Kulagov and S. L. Mandel'shtam (Ref 5), is mentioned in the further discussion of the results. There are 2 figures and 6 Soviet references.

VAN'YUKOV, M. P. MAK, A. A.

Investigation of Spark Discharge Channel Brightness in Various Cases.

report submitted for: The 5th International High Speed Photography Congress, Washington, D. C. 16-22 Oct., 1960.

VANYUKOV, M.P., kand.fiz.-matem.nauk; ISAYENKO, V.I., inzh.

Load limits of spark discharge tubes. Svetotekhnika 6 no.3: 7-11 Mr '60. (MIRA 13:6)

1. Gosudarstvennyy opticheskiy institut.
(Electric discharge lighting)

69271

S/051/60/008/04/002/032
E201/E691

9.3150

AUTHORS: Va[illegible]kov, M.P., Mak, A.A. and Muratov, V.R.

TITLE: An Investigation of Spark Discharges in Helium

PERIODICAL: Optika i spektroskopiya, 1960, Vol 8, Nr 4, pp 439-445 (USSR)

ABSTRACT: The authors studied the time dependence of the arc and spark line contours emitted by a spark discharge in helium. The discharge was produced by 2.5-10 kV pulses from a 0.05 μF capacitor (the inductance, L, of the discharge circuit was 0.18 or 3.6 or 25 μH). The sparks passed through a discharge tube filled with helium of industrial purity at a pressure of 2.6-12 atm. Emission was recorded in the wavelength region 2500-5500 Å. A Geisler discharge tube was used to produce a calibration spectrum. It was found that in the initial stages of the discharges a strong continuous background was emitted, superimposed on which there were two intense spark (He II) lines at 4686 and 3203 Å (Figs 1 and 2). Arc lines of helium (He I at 3188, 3889, 4470, 4471 and 5016 Å, cf. Figs 3-5) appear later, about 0.3-0.5 μsec from the beginning of the discharge. Both the spark and the arc lines emitted by these discharges were strongly broadened and displaced due to the Stark effect. The asymmetry of the arc lines was due to their

[illegible]ation. 7 of which

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S/051/60/009/006/015/018
E201/E191

AUTHORS: Balashov, I.F., Vanyukov, M.P., Muratov, V.R., and Hilov, Ye.V.

TITLE: Image-Converter Recording of Spark-Discharge Spectra Resolved in Time and Along the Channel Cross-Section

PERIODICAL: Optika i spektroskopiya, 1960, Vol.9, No.6, pp 790-791

TEXT: The authors describe a method of recording rapidly changing spark-discharge spectra using small portions of the discharge channel. The apparatus is shown schematically in Fig.1. Light proceeds via a monochromator M and is projected by a lens O_4 on the photocathode of an image converter ЭОП (EOP) fitted with an electronic shutter. The shutter is connected to a generator of square pulses 3. The generator is synchronized with the discharge by means of a photomultiplier 1 and a synchronization circuit 2. In this way one obtains a spectrum on the image-converter screen at a time governed by the delay between opening of the electronic shutter and the beginning of the discharge. Exposures can be varied from 0.1 to 10 μsec and

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E201/E191

Image-Converter Recording of Spark-Discharge Spectra Resolved in Time and Along the Channel Cross-Section

spectra can be recorded 0.07 to 25 μsec from the beginning of a discharge. The image-converter screen is photographed with a camera, denoted by Φ in Fig.1. The method was applied to a 10 kV discharge across a 4 mm gap in air: N I, N II, and H_α lines were recorded 1, 5, 10 and 21 μsec from the beginning of the discharge (Fig.2).
There are 2 figures and 5 references: 3 Soviet and 2 English.

SUBMITTED: June 22, 1960

Card 2/2

86034

S/020/60/135/003/013/039
B019/B077

26.2313

AUTHORS: Vanyukov, M. P., Mak, A. A., and Sadykova, A. I.

TITLE: The Maximum Brightness of a Spark Discharge Channel

PERIODICAL: Doklady Akademii nauk SSSR, 1960, Vol. 135, No. 3, pp. 557-559

TEXT: The authors investigated the maximum brightness of a spark discharge channel in argon, nitrogen, air, and helium at extreme high current surges ($U/L \approx 10^{12}$ a/sec). The high-pressure chamber used for these tests was developed by V. R. Muratov. The light was obtained through a special window. The discharge circuit consisted of the following parameters: C = 0.1 - 1.0 microfarad, L = 4 - 8 henry, and U = 2 - 10 kv. The discharge gap was 1.5 mm. In the range from 4000 - 9000 A the continuous background was studied, also the lines He II with 4686 A, Ar II with 4348 A, N III with 4097 A, and N II with 5045 A. The results show that the maximum brightness depends on producing an opacity of the discharge channel. With an increasing current surge the opacity will first appear in the red part of the spectrum and shift over to the blue part as the

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86034

The Maximum Brightness of a Spark Discharge Channel

S/020/60/135/003/013/039
B019/B077

surge increases. With the above-mentioned parameters of the current circuit opacity is easily obtained in heavy gases. The authors mention the relation between atomic weight and pressure of the gas which will produce a maximum brightness. The theoretical results agree very well with those found experimentally. There are 2 figures, 1 table, and 9 references: 6 Soviet, 1 German, and 1 US.

PRESENTED: May 25, 1960, by A. A. Lebedev, Academician

SUBMITTED: May 20, 1960

Card 2/2

ANDREYEV, S.I.; VANYUKOV, M.P.

Equipment for producing light flashes of a 10^{-7} - 10^{-8} second duration. Prib. i tekh.eksp. 6 no.4:76-79 Jl-Ag '61. (MIRA 14:9)

1. Gosudarstvennyy opticheskiy institut.
(Electric discharges)

20728
S/051/61/010/004/006/007
E032/E314

9.4140 (also 1138, 1141)

AUTHORS: Balashov, I.F., Vanyukov, M.P., Muratov, V.R. and Nilov, Ye.V.

TITLE: The Recording of Time-resolved Spectral Line Profiles by Means of an Image Converter

PERIODICAL: Optika i spektroskopiya, 1961, Vol. 10, No. 4, pp. 540 - 541

TEXT: The present authors point out in*Ref. 1 that the image-converter method can be used to record time-resolved spectra of various parts of a spark discharge. The present note reports results obtained with this method in the recording of time-resolved spectral line profiles. The method has the advantage that a single flash is sufficient to record the profile. The apparatus employed is said to have been described in*Ref. 1. It incorporated the ИСП-51 (ISP-51) spectrograph with an 800 mm focal length camera. The image-converter was switched on by 1 μs pulses at different times after the onset of the discharge. The image of the spectral line was photographed from the image-

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*Optika i spektroskopiya, 1960, Vol. 9, No. 6, pp 790-791

The Recording of ....

converter screen with a 1:1 magnification, using a photographic objective with a focal ratio of 1:1.5. Fig. 2 shows the distribution of the intensity at the centre of the H_α line across the channel of a spark discharge in hydrogen. Fig. 3 shows the H_α profile emitted by the central zone of the channel. Preliminary calculations show that by using the highest-sensitivity image-converters (Butslov et al - Ref. 6) and with an intensity corresponding to the saturation region (Vanyukov and Mak - Ref. 7) the profile of the spectral line can be recorded with a spectral resolution of 0.1 Å with an exposure of 1 nsec.
There are 3 figures and 7 references: 6 Soviet and 1 non-Soviet.

SUBMITTED: October 14, 1960

VANYUKOV, M.P.; MURATOV, V.R.; MUKHITDINOVA, I.A.

Time radiation spectra of spark discharges in inert gases in the region between 5,000 and 10,000 Å. Opt. i spektr. 11 no.3:312-318 S '61. (MIRA 14:9)
(Electric discharges through gases)
(Radiation)

ANDREYEV, S.I.; VANYUKOV, M.P.

Using a spark discharge for producing intensive scintillations of a duration of 10^{-7} to 10^{-8} sec. Part 1. Investigation of electric processes in a spark discharge of nanosecond duration. Zhur.tekh. fiz. 31 no.8:961-974 Ag '61. (MIRA 14:8)
(Electric discharges) (Scintillation (Physics))
(Oscillography)

39156
S/120/62/000/003/020/048
E039/E135

9.3280 (also 2301, 2901)

AUTHORS: Andreyev, S.I., Vanyukov, M.P., and Serebryakov, V.A.

TITLE: The use of ferrites for the generation of powerful high voltage pulses of nanosecond duration

PERIODICAL: Pribory i tekhnika eksperimenta, Vol 7 nb.3, 1962, 89-92

TEXT: The characteristic sharp change in the value of the magnetic permeability μ of ferrites with increasing magnetic field causes the generation of a high voltage pulse U_p when a ferrite element is included in a spark discharge circuit

$$U_p = L_o \mu(t) \frac{di}{dt}$$

where: L_o is the inductance of the ferrite element at $\mu = 1$; di/dt is the rate of change of current in the circuit. The ferrites (Ni,Zn) Ф-600 (F-600), Ф-1000 (F-1000), Ф-2000 (F-2000), (MgZn) МТ-2000 (MT-2000) and ferrites with rectangular loops are investigated. There appears to be little difference between the voltage pulses obtained using Ni,Zn group and the ferrites with rectangular loops. Amplitude and duration characteristics of the

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The use of ferrites for the generation..

pulses produced by the ferrites F-2000 and MT-2000 are investigated in more detail. It is shown that voltage pulses of ~10 kV and lasting a few nanoseconds can be produced across a 100 Ω resistance using F-2000 (i.e. 1 Megawatt pulse) with a discharge capacity of 3300 μf and inductance 0.1 μhenry. Pulse lengths of ~30 nanoseconds are obtained using the ferrite MT-2000 but at a much lower voltage. The effect of circuit parameters on amplitude, duration and frequency of pulses is described in detail. There are 5 figures.

ASSOCIATION: Gosudarstvennyy opticheskiy institut
(State Optical Institute)

SUBMITTED: September 21, 1961

Card 2/2

ANDREYEV, S. I.; VANYUKOV, M. P.; DANIEL', Ye. V.

Method for recording the radiation spectra of a pulse discharge with a time resolution of 10^{-8} sec. Opt. i spektr. 13 no.6: 863-865 D '62. (MIRA 16:1)

(Oscillography) (Electric discharges)

31948
S/057/62/032/001/008/018
B146/B112

9,4120

AUTHORS: Andreyev, S. I., Vanyukov, M. P., Komolov, A. B., (Deceased)

TITLE: Development of the spark discharge channel with very steep current increase in the discharge circuit

PERIODICAL: Zhurnal tekhnicheskoy fiziki, v. 32, no. 1, 1962, 57-62

TEXT: The authors experimentally study the validity of the hydrodynamic theories on the development of a spark discharge channel by S. I. Drabkina (Ref. 1: ZhETF, 21, 473, 1951) and S. I. Braginskiy (Ref. 2: ZhETF, 34, 1548, 1958) for a very steep current increase in discharges up to 1 joule in air. Data on the widening of the spark channel were recorded by an electron-optical converter type ПИМ-3 (PIM-3) with oxygen-cesium and antimony-cesium photocathodes. The authors operated with 500-7500 pF capacitors, a voltage of 3-23 kv, and an inductivity of the discharge gap of 10-80 nHy. It was shown that the hydrodynamic theory by Drabkina agreed with the experiment in the first quarter of the oscillation period only. For later periods, the theoretical values of both the channel width and the widening velocity are too high. The values of the

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channel width according to Braginskiy, however, agree with the experiment, even after more than one period. The radiative energy losses are not expressed in the formulas by Braginskiy; therefore, the good agreement of his theory with the experiment gives proof of the low effect of radiation on the channel development. The widening velocity of the channel in the initial stage of discharge agrees in theory and experiment, attaining 10-12 km/sec; at the end of this stage, which corresponds to the period of growing electrical conductivity and lasts about $5 \cdot 10^{-9}$ sec, the amperage attains the value of 300-600 a for discharge in air under atmospheric pressure and an electric breakdown voltage of 30-40 kv/cm, while the channel radius is 0.05 mm. There are 4 figures and 11 references: 10 Soviet and 1 non-Soviet. The reference to the English-language publication reads as follows: H. Fischer J. Opt. Soc. Amer., 47, 981, 1957.

SUBMITTED: March 22, 1961

Card 2/2

34209

S/057/62/032/002/010/022
B124/B102

26.2311

AUTHORS: Vanyukov, M. P., and Isayenko, V. I.

TITLE: Study of light emission from the electric explosion of thin wires

PERIODICAL: Zhurnal tekhnicheskoy fiziki, v. 32, no. 2, 1962, 197 - 201

TEXT: The development of the cloud of explosion products and of light emission in electric explosions of different wires was studied by using electron-optical devices. Current pulses were obtained by discharging a 20 μf capacitor bank which had been charged up to 10 kv. The inductance of the discharge circuit was 0.5 μh, and the steepness of current rise was $2 \cdot 10^{10}$ a/sec. It has been shown that the propagation rate of the front of explosion products increases with increasing diameter of the exploded wire and with a decrease of its length. Light emission originates in the narrow channel between the shock wave and the dense cloud of explosion products. The channel propagates to cover the whole surface of the explosion products. Gas and vapor temperatures behind the shock wave front

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Study of light emission ...

reach $4 \cdot 10^3$ °K and more, which leads to considerable ionization of the metal vapor giving rise to discharge. The time between the moment when the current passes through and that when the cloud begins to expand is proportional to the diameter of the wire and independent of its length. The time lag between the moment when the cloud begins to form and that when light emission starts increases with the wire length. Its dependence on the diameter is complex. At an explosion velocity of 2.5 to 3 km/sec, light emission sets in almost simultaneously with the explosion. Explosion of a wire takes place at a current density of about $5 \cdot 10^7$ a/cm^2 irrespective of its diameter. This value is in good agreement with previous results. Wires 0.1 to 0.2 mm in diameter exhibit a marked change in propagation velocity of the cylindrical shock wave at the moment when the glow covers the whole surface of the cloud of explosion products. As to the differences between the shapes of glow channels in spark discharge in air and in an explosion of a wire caused by current fluctuations in the discharge circuit, it has been concluded that, with the rapid increase of current from the second halfperiod onward, a shock wave is generated, which propagates either through the heated gas, or through the heated metal va-

Card 2/3

Study of light emission ...

por. Since the least ionization potential of air gases is above 13 ev, while that of copper vapor is 7.7 ev, it is quite natural that secondary shock waves give rise to more intense glow than that effected by the shock wave due to spark discharge in air. When the current in the circuit of the exploding wire is periodically changed, the glowing metal vapor forms hollow cylinders propagating at the rate of 20 to 30 km/sec. N. N. Dmitriyev and V. I. Druyan are mentioned. There are 5 figures and 10 references: 6 Soviet-bloc and 4 non-Soviet-bloc. The reference to the English-language publication reads as follows: Exploding Wires, Edited by W. G. Chace and H. K. Moore, Plenum Press, Inc., New York, 1959.

SUBMITTED: April 26, 1961

Card 3/3

S/057/62/032/003/017/019
B142/B102

AUTHORS: Vanyukov, M. P., Isayenko, V. I., and Travleyev, G. N.

TITLE: Discontinuities in the spark channel which develope at high repetition frequency of discharges

PERIODICAL: Zhurnal tekhnicheskoy fiziki, v. 32, no. 3, 1962, 373-374

TEXT: Irregularities occurring in high-frequency spark discharges in the spark channel were studied. The sparks were photographically examined in an ISSh-500 (ISSh-500) lamp filled with xenon of 4 atm. The discharges were filmed (running speed of film, 40 m/sec). The image scale was 1:1. The frequencies used were the limits at which the studied phenomena appeared. At f = 400 cps, the position of the spark channel between the electrodes is stable. The appearance of the channel is determined by shape and arrangement of the electrodes. At f = 2000 cps, the channel bends considerably and takes a different position with every discharge. With both frequencies, the mean power was approximately the same (130 watts at 400 cps, 160 watts at 2000 cps). Points of discontinuity appeared in the channel at 3 - 4 kcps. The channel seemed to be interrupted,

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B142/B102

Discontinuities in the spark channel ...

individual points of intensive glow became visible. Several discharges may occur in one channel. The point of discharge may shift along the channel with every discharge (velocity of shift = 1-2 m/sec). Sometimes, the discharge zone broadens near the electrodes. An intense afterglow occurs in the discharge zone for 50-200 μsec. This afterglow is assumed to be caused by metal vapor (evaporation of electrodes) which has a much lower ionization potential than the other gas. The winding path of the spark is explained by clouds of heated gas which form in the channel and along the boundaries of which the spark runs. These local heatings cannot be eliminated between the individual discharges since high pressure gradients are missing, and convection is only sufficient to shift them. The discontinuities in the spark channel are explained by the fact that in gases of poor deionization capacity the current does not flow through the narrow channel but through a wider gas zone. Thus, the current density is lower in these sections and, with it, also the luminous intensity. In air, these phenomena were not observed, even with frequencies of up to 20 kc/sec. There are 3 figures and 1 Soviet reference.

SUBMITTED: June 14, 1961
Card 2/2

S/057/62/032/006/C15/022
B108/B102

AUTHORS: Andreyev, S. I., and Vanyukov, M. P.

TITLE: The use of a spark discharge to produce intense light flashes lasting 10^{-7} - 10^{-8} sec. II. Optimum relationship between spark energy in air and duration of the light flash

PERIODICAL: Zhurnal tekhnicheskoy fiziki, v. 32, no. 6, 1962, 738 - 745

TEXT: The effect of the discharge parameters on the speed and duration of energy delivery in a spark channel was studied in order to arrive at the optimum relation between discharge energy and length and intensity of the resulting light flash. On the basis of earlier work (ZhTF, 31, 961, 1961) it was established that under stiff discharge conditions 85 - 95% of the total energy stored in a capacitor is delivered in the first semiperiod of the current oscillation. This fraction is determined only by the degree of the discharge $\psi = U_o/L(di/dt)_{max}$. An increase in discharge energy through raising the operating voltage entails a decrease in the overall duration of the electrical process. However, the duration of

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B108/B102

The use of a spark discharge ...

the light flash always increases with the discharge energy. When the discharge energy is given, the discharge time will decrease as the capacity is reduced and the voltage U_0 is increased. An increase in discharge energy when its duration is to remain unchanged can be achieved only if the discharge gap is prolonged. Aperiodic spark discharges in air with a length of the electrical impulse of $20 \cdot 10^{-9}$ sec were got at discharge energies of 0.13 joules. Such a discharge produces light flashes of $(40 - 45) \cdot 10^{-9}$ sec. When the length of the spark channel is given, a definite relation exists between the duration of the flash and the maximum energy which can be set free in the discharge circuit. Experimental data are given. There are 4 figures and 1 table.

SUBMITTED: June 13, 1961

Card 2/2

24.2120

S/057/62/032/006/016/022
B108/B102

AUTHORS: Vanyukov, M. P., Isayenko, V. I., and Travleyev, G. N.

TITLE: Recovery of the electrical strength of a spark gap in repeated discharges

PERIODICAL: Zhurnal tekhnicheskoy fiziki, v. 32, no. 6, 1962, 746 - 752

TEXT: The range in which the voltage of a spark discharge can be controlled and the limiting load of a spark gap were determined. The recovery of a gap as depending on the frequency at which the discharges follow was examined. It was found that in the first 10 - 15 μsec after the discharge has stopped the disruptive strength of the gap remains virtually unchanged (200 - 400 v). The disruptive voltage is only slightly dependent on the gap length. The subsequent stage of the process is the collapse of the channel sheath and becomes obvious in a rapid rise of the disruptive strength owing to the cooling of the gas. Strength in this stage increases at a rate of 50 - 120 v/μsec. The stage with low disruptive voltage is longer in xenon than in air. This is due to the greater mass of the xenon atoms, which sustain the channel after the end of the discharge for a

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longer time than in air. Extreme recovery rates (up to 125 v/μsec) at very high frequencies are due to a decrease in energy of each individual discharge and to inhomogeneities in the gap. At too high frequencies, the strength is either lost completely (continuous discharge) or causes an unstable operation. If the gas is blown through the gap the power per unit length of the channel can be increased considerably (up to 400 watt/cm). At high frequencies, however, blowing has no essential effect on recovery. This is obviously due to the fact that the gas at the moment of discharge is in a state of intense movement. There are 6 figures.

SUBMITTED: July 24, 1961

Card 2/2

ANDREYEV, S.I.; VANYUKOV, M.P.; STAROVOYTOV, A.T.

Effect of an external magnetic field on the light characteristics of a pulsed discharge in helium. Zhur. eksp. i teor. fiz. 43 no.3:804-807 '62. (MIRA 15:10)

1. Gosudarstvennyy opticheskiy institut.
(Magnetic fields) (Electric discharges through gases) (Helium)

ANDREYEV, S.I.; VANYUKOV, M.P.; STAROVOYTOV, A.T.

Effect of an external magnetic field on the development of a pulsed discharge in argon. Zhur. eksp. i teor. fiz. 43 no.5:1616-1618 N '62. (MIRA 15:12)

1. Gosudarstvennyy opticheskiy institut imeni S.I. Vavilova.

(Electric discharges through gases)

S/120/62/000/002/029/047
E192/E382

AUTHORS: Andreyev, S.I., Vanyukov, M.P. and Daniel', Ye.V.

TITLE: Increase in the intensity and reduction of the duration of a light burst radiated by a spark discharge

PERIODICAL: Pribory i tekhnika eksperimenta, no. 2, 1962, 127 - 129

TEXT: The discharge system which was investigated experimentally is shown in Fig. a. The tube contains 5 metal plates 1, which are in the form of steel discs, 0.2 mm thick and 12 mm in diameter. The centres of the discs are provided with brass inserts 2, whose heads are hemispherical and have a curvature of 0.2 mm. The plates are furnished with sector-shaped apertures as outlets for the light. The discs are kept in position by means of the dielectric cylinder 3, which is also provided with an aperture. The spacing between the discs is determined by the thickness of the dielectric washers 4, the dielectric being perspex. The system is mounted between two massive brass electrodes 5. The overall

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Increase in the intensity ....

length of the air gaps is 4.3 mm. The discharge is initiated under the following conditions (Ref. 3 - the authors - Zh. tekhn. fiz., 1961, 31, 961): capacitance of the condenser C = 0.015 μF, voltage U = 15 kV and inductance of the circuit L = 11 nH. The constructional details of the circuit were described in Ref. 4 (paper read by the authors at the Second Conference on High-speed Photography and Cinematography). The experiments were carried out with single discharges in air and the electrical and light characteristics of the discharge were compared with those of the similar characterics of a normal air gap, 4.9 mm long. It was found that the discharge was oscillatory and that the presence of a number of metal plates in the gap resulted in an increase in the gap resistance. The measurements also showed that the additional metal plates led to a 30% reduction in the duration of the light bursts and a 1.8-fold increase in the intensity of the light emitted per unit length of the gap (when compared with the performance of a normal gap). This increase in intensity and reduction in duration of the discharge was observed over the whole investigated spectrum

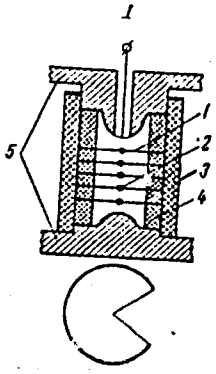
Increase in the intensity ....

from 4 000 - 6 400 Å. The spectral-density distribution was unchanged by the presence of the metal plates. There are 7 figures.

ASSOCIATION: Gosudarstvennyy opticheskiy institut (State Optical Institute)

SUBMITTED: July 29, 1961

Fig. a:



Card 3/3

VANYUKOV, M.P.

Sixth International Congress on High-Speed Photography. Zhur.nauch. i prikl. fot. i kin. 8 no.2:157-158 Mr-Ap '63. (MIRA 16:3)
(Photography, High-speed--Congresses)

9,3150 (1049, 1482, 1395)

34023
S/056/62/042/001/048/048
B142/B112

AUTHORS: Andreyev, S. I., ~~Vanyukov, M. P.~~

TITLE: "Channel propagation of strong miniature sparks" Remarks to the article by B. A. Demidov, Yu. F. Skachkov, and S. D. Fanchenko

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 42, no. 1, 1962, 309

TEXT: The conclusion drawn by Demidov, Skachkov, and Fanchenko as the result of their studies on spark discharges of capacitors of low capacity, that the spark channel expansion at a rate of 60-80 km/sec is doubted. It is supposed that the substantiating picture does not represent the very spark channel, but the stage of streamer discharge preceding the channel propagation proper (analogous to the picture taken by Saxe and Chippendale). Final studies on the propagation rate of the channel are still necessary. The lines of investigation persued by Saxe and Chippendale should be followed. Also the rate at which the amperage is supposed to increase at the beginning of the discharge is considered too high for the investiga-

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"Channel propagation of ...

tions made by the authors with the use of 500-5500 pF capacitors with hard sparks of 0.01-1.0 joule show, that the maximum of the amperage, which depends on the resistivity in the spark channel, is reached only a few nano seconds after the beginning of discharge. Since here only capacitors of low capacity are concerned, the current is expected to increase even more slowly than was found by the authors. There are 4 references: 4 Soviet and 1 non-Soviet. The reference to the English-language publication reads as follows: R. F. Saxe, R. A. Chippendale. Brit. J. Appl. Phys., 6, 336, 1955.

ASSOCIATION: Opticheskiy Institut im. S. I. Vavilova (Optical Institute imeni S. I. Vavilov)

SUBMITTED: April 25, 1961

Card 2/2

VANYUKOV, M.P., kand. fiz.-matem.nauk; ISAYENKO, V.I., inzh.; TRAVLEYEV, G.N., inzh.

Regulation range and load limits of high-pressure stroboscopic pulse lamps. Svetotekhnika 9 no.8:20-23 Ag '63. (MIRA 16:8)

1. Gosudarstvennyy opticheskiy institut.
(Electric lamps)

L 10078-63 EWA(k)/EWT(l)/EWP(q)/FBD/EDS/T-2/3W2/EEC(b)-2/ES(t)-2--
AFFTC/ASD/ESD-3/RADC/APGC/AFWL/SSD--P1-4/Po-4--GG/JHB/WH/MG/IJP(C)/K/EH
ACCESSION NR: AP3000594 B/0051/63/014/005/0734/0736

AUTHOR: Vanyukov, M. P.; Isayenko, V. I.; Lyubimov, V. V. 86

TITLE: Time variation of the spectral composition of the emission of the ruby laser

SOURCE: Optika i spektroskopiya, v. 14, no. 5, 1963, 734-736

TOPIC TAGS: ruby laser emission, ruby laser spectrum

TEXT: Time-sequence photographs of the emission line spectrum of the ruby laser have been obtained. The spectral lines were separated by a Fabry-Perot interferometer and detected by an electron-optical image converter. Various ruby samples were used in the laser, and the interferometer base was varied from 4 to 25 mm. The pumping energy of the laser was also varied. Photographs show that the energy of the laser pulse can consist of one, two, or three lines and that emission wavelength can vary from

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L 10078-63
ACCESSION NR: AP3000594

pulse to pulse within an interval of 0.2 Angstrom, with no apparent regularity. The results coincide with those obtained by Hughes and by McMurtry and Siegman. Orig. art. has: 3 figures.

ASSOCIATION: none

SUBMITTED: 20Oct62 DATE ACQ: 12Jun63 ENCL: 00

SUB CODE: 00 NO REF SOV: 000 OTHER: 005

bm/kl
Card 2/2

L 18854-63 EPF(c)/EWT(l)/EWP(q)/EWT(m)/BDS/EED(b)-3 AFFTC/ASD/
AFMTC/RADC/APGC/IJP(C)/SSD Pr-4 JD

ACCESSION NR: AP3003958 S/0057/63/033/007/0859/0863

12
69

AUTHOR: Andreyev, S.I.; Vanyukov, M.P.

TITLE: Investigation of the influence of afterglow on the duration of ultrashort light flashes produced by spark discharges

SOURCE: Zhurnal tekhnicheskoy fiziki, v.33, no.7, 1963, 859-863

TOPIC TAGS: light flash, spark discharge, high-speed photography, nanosec light source , He, Ar, N, helium, argon, nitrogen

ABSTRACT: In recent years a number of investigators have reported obtaining nanosecond light flashes from spark discharges in air, hydrogen and nitrogen. Spark discharges in inert gases, which have a high light yield, are not used for obtaining brief flashes owing to the persistent afterglow of such gases. But actually the reports of different experimenters on the total duration of light flashes in inert gases are conflicting. Hence it was deemed of interest to undertake a systematic investigation of the role of afterglow as regards the duration of light flashes appearing as a result of high-power nanosecond discharges in different inert gases. The gases tested were A, He and N_2. The discharges were realized in a

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L 18854-63

ACCESSION NR: AP3003958

3

circuit with a C = 900 pF capacitor at voltages V from 4 to 25 kV. The entire circuit was mounted in a sealed chamber which was filled with the investigated gas at different pressures to 25 atm. The discharge current was recorded with a time resolution of 10^{-9} sec; the discharge radiation with a resolution of 3×10^{-9} sec. The afterglow time t_{ag} was determined as the difference between the flash time t_f, measured at 1/3 the peak intensity, and the total duration t_c of the discharge current. Oscillograms show that the electric processes in the gap depend on the nature of the gas: discharges in A and He are aperiodic; those in N_2 are oscillatory. t_c for A and He is shorter than for N_2. Curves for t_{ag} versus the rate of energy release in the gap are presented. At low discharge energies (under 0.01 joule) none of the tested gases exhibit afterglow. Increase of t_{ag} with discharge power (and rate of energy liberation) is greatest in A, and very weak in N_2. With increasing pressure t_{ag} increases in A, but not in He and N_2. With increase of the gap width t_{ag} decreases in A, but remains virtually constant in He and N_2. Thus, for discharges in argon one can reduce the afterglow time and total emission time by reducing C and increasing V and the gap width. Consequently, flashes of the same short duration as in N_2 can be realized in He and A, but only at great sacrifice in intensity. Orig. Art. has: 4 figures and 1 table.

Card 2/02

AID Nr/ 984-5 6 June

TIME VARIATION OF SPECTRAL COMPOSITION OF Nd-DOPED GLASS LASER OUTPUT (USSR)

Vanyukov, M. P., V. I. Isayenko, and V. V. Lyubimov. Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 44, no. 4, Apr 1963, 1151-1152

S/056/63/044/004/006/044

The variation of the spectral composition of the output of a neodymium-doped glass laser with time is investigated. A glass cylinder 60 mm long and 3/8 mm in diameter containing 2% Nd_2O_3 was used. A spectral dispersion of 14 A/mm was accomplished by a diffraction spectrograph, and the time variation was registered by an electron-optical converter. The time resolution was ~5 sec. The results, with superthreshold pumping powers of a) 20%, b) 40%, and c) 70%, are shown in the illustration. The simultaneous production of several lines with superthreshold pumping power is explained as due to the establishment of population inversion for several pairs of sublevels at the same time.

Card 1/2

AID Nr. 964-5 6 June

TIME VARIATION OF SPECTRAL COMPOSITION [Cont'd] S/056/63/044/004/006/044

Card 2/2

[BB]

L 10524-63 EWA(k)/EWT(l)/FBD/T-2/BW2/BDS/EEC(b)-2/ES(t)-2--AFFTC/ASD/ESD-3/RADC/APGC/AFWL--PL-4/Po-4--JHB/WB/EM/JDP(C)

ACCESSION NR: AP3000040 S/0056/63/044/005/1493/1496

AUTHOR: Venyukov, M.P.; Isayenko, V. I.; Serebryakov, V. A. 82 81

TITLE: Investigation of directivity of emission of an optical quantum generator

SOURCE: Zhurnal eksper. i teoret. fiziki, v. 44, no. 5, 1963, 1493-1496

TOPIC TAGS: laser, emission direction, rod cross section, neodymium-doped glass

ABSTRACT: Neodymium-doped glass rods with cross sections of various shapes have been studied to determine the effect of the shape on the directional properties of laser emission. The polished ends of the samples received a dielectric coating. The samples were pumped by two pulsed lamps, and the emission was detected by an electron-optical image converter. The distribution of oscillation zones in the rod was photographed. The results show the stimulated emission from rods of square, rectangular, and octagonal cross section can be propagated in several discrete directions. The presence of these directions is

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L 10524-63
ACCESSION NR: AP3000040

attributed to the formation of additional closed paths of oscillator beams as a result of multiple reflections from parallel side walls. Emission from rods of circular cross section is propagated in only one principal direction, perpendicular to the end faces. Orig. art. has:6 figures.

ASSOCIATION: Gosudarstvenny*y opticheskiy institut (State Institute of Optics)

SUBMITTED: 12Dec62 DATE ACQ: 12Jun63 ENCL: 00

SUB CODE: PH, SD NO REF SOV: 001 OTHER: 001

mcs/CA
Card 2/2

L 11056-66 EWT(l)/EWT(m)/EWP(t)/EWP(b) IJP(c) JD/WW/GG

ACC NR: AT6001393 SOURCE CODE: UR/3180/64/009/000/0115/0115

AUTHOR: Vanyukov, M. P. (Candidate of physico-mathematical sciences); Mak, A. A.

ORG: none

TITLE: Study of pulsed light sources of limiting brightness

SOURCE: AN SSSR. Komissiya po nauchnoy fotografii i kinematografii. Uspekhi nauchnoy fotografii, v. 9, 1964. Vysokoskorostnaya fotografiya i kinematografiya (High-speed photography and cinematography), 115

TOPIC TAGS: light source, gas discharge spectroscopy, helium, nitrogen, argon, optic brightness

ABSTRACT: In order to determine the limiting brightnesses of pulsed light sources, the brightness of the spark discharge channel was studied in an atmosphere of helium, argon, nitrogen, and air at high rates of current buildup in the discharge. To this end, a discharge circuit based on a low-induction cylindrical capacitor was developed. Measurements of the spectral density of the discharge channel brightness were based on the continuous and line emission in the 4000-9000 Å range. In all gases studied, the limiting brightness was successfully obtained. It was found that under limiting conditions the discharge channel is opaque and radiates like an absolute black body with a temperature equal to that of the channel. Orig. art. has: 1 table

SUB CODE: 20, 07/ SUBM DATE: 00/ ORIG REF: 002/ OTH REF: 000

Card 1/1 HW

L 11068-66 EWT(1)/EWA(m)-2 IJP(c) AT

ACC NR: AT6001394 SOURCE CODE: UR/3180/64/009/000/0116/0120

AUTHOR: Vanyukov, M. P. (Candidate of physico-mathematical sciences); Isayenko, V. I.; Lyubimov, V. V.

ORG: none

TITLE: Spatial instability of the luminous element of high-pressure pulse lamps operating under repeated flash conditions

27
B+1

SOURCE: AN SSSR. Komissiya po nauchnoy fotografii i kinematografii. Uspekhi nauchnoy fotografii, v. 9, 1964. Vysokoskorostnaya fotografiya i kinematografiya (High-speed photography and cinematography), 116-120

TOPIC TAGS: flash lamp, spark gap, electric discharge

ABSTRACT: A photoelectric method was developed for measuring the probability distribution of the position of spark discharge channels in space when the gap is cut in under repeated discharge conditions. The spatial distribution of the channels depends on the shape of the electrodes. The width of the distribution is 0.35 mm for conical electrodes and increases to 1-2 mm for electrodes in the shape of a hemisphere or frustum of a cone. The widths of channel distribution in ISSh-type high-pressure pulse lamps range from 0.5 to 1.5 mm. Methods are described for improving the spatial stability of the channel by introducing two auxiliary electrodes into the

Card 1/2

L 11068-66

ACC NR: AT6001394

spark gap when the gap is flushed with a stream of gas having a low breakdown capacity and when a surface discharge on a ceramic surface is used. Orig. art. has: 6 figures, 1 table.

SUB CODE: 20,13 SUBM DATE: 00/ ORIG REF: 000/ OTH REF: 002

Card 2/2

L 10067-66 EWT(1) IJP(c) WW/GG

ACC NR: AT6001395 SOURCE CODE: UR/3180/64/009/000/0121/0125

AUTHOR: Vanyukov, M. P. (Candidate of physico-mathematical sciences); Isayenko, V. I.; Trovleyev, G. K.

31
B

ORG: none

21

TITLE: Limiting loads of pulse lamps operating under repeated flash conditions

SOURCE: AN SSSR. Komissiya po nauchno fotografii i kinematografii. Uspekhi nauchnoy fotografii, v. 9, 1964. Vysokoskorostnaya fotografiya i kinematografiya (High-speed photography and cinematography), 121-125

TOPIC TAGS: light pulse, spark gap, flash lamp, electric discharge

ABSTRACT: The article deals with the recovery of the breakdown resistance of a spark gap operating under conditions of repeated flashes with a limiting load at a discharge repetition rate of up to 20 kc. In operation with a given flash repetition rate, the limiting power of a pulse lamp can be raised by increasing the capacitance of the working capacitor. When the discharge repetition rate is increased, the power expended in the lamp is determined by two opposite factors: a drop in the energy of the individual flash as a result of the decrease in the breakdown voltage, and an increase in the total number of flashes. For every regime of the discharge circuit, there exists a frequency after the attainment of which the average power dissipated in the lamp becomes limited. At high discharge repetition rates in the air spark gap, a de-

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L 11067-66

ACC NR: AT6001395

crease in the luminous efficiency of the flashes is observed. A difference was noted in the course of the curves representing the recovery of the breakdown resistance for limiting loads of pulse lamps as a function of the flash repetition rate. Strong flushing of the spark gap permits a considerable (fourfold) increase in the power expended in the gap because of a fast cooling of the gas and an equalization of its density. Orig. art. has: 7 figures.

SUB CODE: 20,13 SUBM DATE: 00/ ORIG REF: 003/ OTH REF: 002

Card 2/2

L 10066-66 EWT(1)/EWA(m)-2

ACC NR: AT6001396 SOURCE CODE: UR/3180/64/009/000/0131/0137

AUTHOR: Vanyukov, M. P. (Candidate of physico-mathematical sciences); Galaktionova, N. M.; Mak, A. A.

84
82
B+1

ORG: none

TITLE: Radiation of pulsed light sources in the ultraviolet

SOURCE: AN SSSR. Komissiya po nauchnoy fotografii i kinematografii. Uspekhi nauchnoy fotografii, v. 9, 1964. Vysokoskorostnaya fotografiya i kinematografiya (high-speed photography and cinematography), 131-137

TOPIC TAGS: emission spectrum, gas discharge spectroscopy, xenon, neon, nitrogen, argon, helium, light pulse, optic brightness

ABSTRACT: The emission spectra of strong spark discharges in xenon, argon, neon, and air in the visible and ultraviolet range (2200-5500 A) were studied. In the case of xenon and argon (gases of high atomic number), the spectra at the instant of maximum radiation consisted of continuous radiation with very diffuse and unresolved lines of singly and doubly ionized atoms of the gas; at later instants, a large number of lines of the ionized gas appear. In the lighter gases (air, neon), the line spectrum is pronounced even at the instant of maximum radiation. For nitrogen, argon, air, and xenon, the distribution of the spectral brightness density at the instant of maximum radiation corresponds to the brightness distribution of an absolute black body. A

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L 11066-66

ACC NR: AT6001396

2

fairly random but strong increase in brightness was observed at the instant of maximum radiation in the region of the positive electrode in the case of the spark discharge taking place in helium and nitrogen. The authors express their deep appreciation to S. I. Levikov, who prepared the hydrogen and deuterium arc lamps, and to M. N. Smolkin, who calibrated them. Orig. art. has: 4 figures, 1 table.

SUB CODE: 20,07 SUBM DATE: 00/ ORIG REF: 001/ OTH REF: 000

Card 2/2

L 11072-66 EWT(l)/EWP(e)/EWT(m)/EWP(b)/EWA(m)-2 WH

ACC NR: AT6001398 SOURCE CODE: UR/0180/64/009/000/0147/0150

AUTHOR: Andreyev, S. I.; Vanyukov, M. F. (Candidate of physico-mathematical sciences); Daniel', Ye. V. 44 44 44

ORG: none 68 D+1

TITLE: Methods of shortening the duration of light flashes emitted by a spark discharge

SOURCE: AN SSSR. Komissiya po nauchnoy fotografii i kinematografii. 44 Uspekhi nauchnoy fotofrafii, v. 9, 1964. Vysokoskorostnaya fotografiya i kinematografiya (High-speed photography and cinematography), 147-150 and insert facing page 113

TOPIC TAGS: flash lamp, spark gap, argon, ceramic dielectric, electric discharge, optic brightness

ABSTRACT: The article deals with a study of the spark discharge 21 on the surface of a ceramic material and when a system of metal plates are introduced into the spark gap in the case where the discharge takes place in argon. The metal plates were found to shorten the length of the discharge current pulse and to eliminate the afterglow without changing the brightness amplitude of the flash. The number of plates must be increased as the energy of the discharge and the argon pressure are raised. When a ceramic material with a dielectric constant $\varepsilon = 150$ was used, a marked damping of the

Card 1/2

L 11072-66

ACC NR: AT6001398 0

discharge and a severalfold increase in the amplitude of the luminous intensity (as compared to the discharge in the absence of this material) were observed. Orig. art. has: 5 figures.

SUB CODE: 13,20 SUBM DATE: 00/ ORIG REF: 007/ OTH REF: 002

Card 2/2

L 15279-66 EWT(1)/EWT(m)/T/EWP(t)/EWP(b) IJP(c) JD

ACC NR: AT6001399 SOURCE CODE: UR/3180/64/009/000/0151/0152

AUTHOR: Vanyukov, M. P. (Candidate of physico-mathematical sciences); Galaktionova, N. A.; Yegorova, V. F.; Mak, A. A.

52
51

ORG: none

TITLE: Radiation from spark discharges in gas mixtures

B+1

SOURCE: AN SSSR. Komissiya po nauchnoy fotografii i kinematografii. Uspekhi nauchnoy fotografii, v. 9, 1964. Vysokoskorostnaya fotografiya i kinematografiya (High-speed photography and cinematography), 151-152

20, 19, 55

TOPIC TAGS: gas discharge plasma, gas discharge, xenon, helium

21, 44, 55

ABSTRACT: Earlier studies of the brightness of spark discharges showed that while in the case of light gases such discharges produce high temperature channels but achieve the limiting brightness only with strong discharges and at high pressures, heavy inert gases exhibit low limiting brightness, but this limit can be reached under soft discharge conditions and at low pressures. In the present note the authors investigate experimentally and theoretically a mixture of a light (basic) and heavy (admixture) gas which would allow the formation of very bright channels under soft discharge conditions and low pressures. Calculations of the ratio of energy losses due to the admixture to those of the basic gas and of the ratio of the respective coefficients of absorption showed that the most promising seem to be mixtures of gases of very different atomic weights (e.g., He + Xe). Experimental results are summarized in Fig. 1.

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L 15279-66
ACC NR: AT6001399

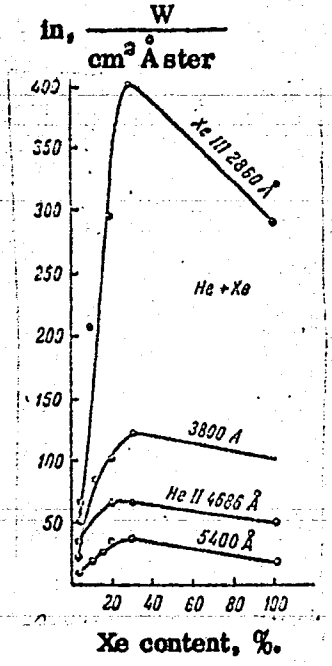

Fig. 1. Spectral brightness density as a function of Xe admixture in helium base gas

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L 15279-66
ACC NR: AT6001399

The brightness increase found in He + Xe mixtures did not materialize in tests using He + Ar mixtures. Orig. art. has: 2 figures.

SUB CODE: 20 / SUBM DATE: none / ORIG REF: 003

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